



# MAPPING SCHOOLYARD DIVERSITY

## Materials:

- ☆ schoolyard map or blueprint and/or building maps—may be available from the principal, based on fire drill diagrams and procedures, produced in computer drafting classes, or the class may map the grounds as part of the activity
- ☆ dichotomous keys for plants (upper grades)
- ☆ field guides for plant identification such as Peterson guides, Audubon guides, *Trees of Arkansas* by Dwight Moore, *A Key to Common Trees of Arkansas* by Frank A. Roth II, University of Arkansas Division of Agriculture Cooperative Extension Service, Fayetteville, or any of Carl Hunter's books on Arkansas plants
- ☆ student and teacher handouts

## Optional:

- ☆ invite garden club members, members of the Arkansas Native Plant Society, or neighborhood gardeners to assist with plant identification

## Rationale

Some of the techniques used by scientists in the study of biological diversity can be applied in any area of land not paved or built upon. Students can begin learning to use these techniques in convenient locations such as the school or at home.

## Objectives

1. Students will learn to collect, interpret, and map data.
2. Students will conduct botanical research.
3. Students will experience using art to communicate.
4. Students will experience the value of collaboration in science.
5. Students will learn that some places have more natural diversity than others do.

## Procedure

NOTE: Start by outlining your building on graph paper, then adding the rest of the school's buildings and grounds. In the lower grades, accuracy and scale are not as important as they are for upper grades. Sometimes school grounds have more domestic plants than native plants and only a few of these will be found in the field guides and keys. Being able to identify plants is not always as important for studying biological diversity as being able to recognize different traits and how these traits fit the environment.

1. Divide students into groups of two to four, depending on the number of students in the class.
2. Divide the schoolyard into segments and assign one group of students to work in each segment.

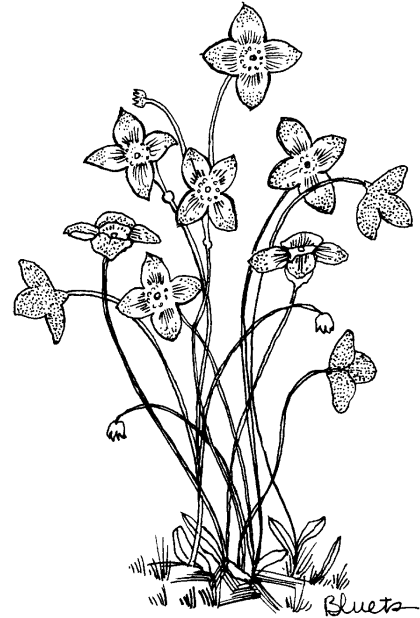
3. Have students map assigned areas showing where different kinds and numbers of plants are growing. Have students use a chart to note environmental factors such as wind direction, sunlight, shade, moisture, etc. For younger students, the list may simply be the numbers and kinds of trees, flowers, fungi, shrubs, grasses, lichens, mosses, algae, etc. Instead of names, they may use sketches or descriptions. Older students may determine families or orders (genera and species if possible) using dichotomous keys and field guides. NOTE: You may want to limit the number of plants your students observe to simplify identification and to save time. See the Teacher Pages at the end of the lesson plan for sample maps and charts.
4. After the maps are completed, conduct a nature walk around the schoolyard with the entire class. As you approach different segments of the schoolyard, ask each group to report its findings to the others.
5. Brainstorm reasons why some plants grow in some areas and not in others. Ask students to correlate plant diversity in each area with soil, light, wind, adjacent land use, foot traffic, and other factors that could affect seed dispersal, germination, plant growth, plant survival, etc.

## Extensions

1. The same observations can be made in the fall, winter, early spring and late spring to note seasonal changes in diversity. Have students discuss which seasons offer more plant diversity and why.
2. Have students map an outdoor environment where they live. Based on their maps, compare diversity in urban and rural environments.
3. Have students select a plant from their area to research (teachers may suggest common plants such as bull thistle, jewelweed, pale purple coneflower, etc.). Have them directly observe as much as possible about the plant, then gather information about it from published materials, electronic sources, relatives and adult friends. Questions students might ask could include:
  - What kind of plant is this?
  - Where does this plant get its name?
  - Where does this plant usually grow?
  - How is it useful to people? How do animals use it? How are other plants affected by it?
  - Why is it admired or why is it considered to be a pest?
  - How big does this plant usually get?
  - Is this plant winter hardy in this area? If not, how did it get here and how does it survive?
  - What is its life expect-

- tancy? Is it an annual or a perennial?
- Does it flower? Have fruit? Make a seed? How is the seed dispersed?
  - What color is it? Will the color change? Explain why these changes might occur.
  - What other plants are its close relatives?
  - Make a list of ways (both positive and negative) the world would be different if this plant no longer existed.
4. Have groups use twigs, flowers, etc. from each study plot to make collages. When the collages are finished, ask each group to show its artwork and to relate things in the collage to their location on the mapped area.
  5. If several teachers use this activity, arrange for students from various levels to work at the same time. Find a location to exhibit all the maps (K--12) that have been produced for each segment of the schoolyard. Note how children at each grade level interpreted each environment and how one activity can be adapted for use by students of different ages. Ask students to tell what they learned from students of other grades who worked in the same location they did.
  6. Have different plants with examples of fruits, seeds, and flowers available in the classroom. Allow students to plant and/or eat certain seeds. Have students estimate the number of seeds

they think a fruit contains, then cut the fruit open and count the seeds.



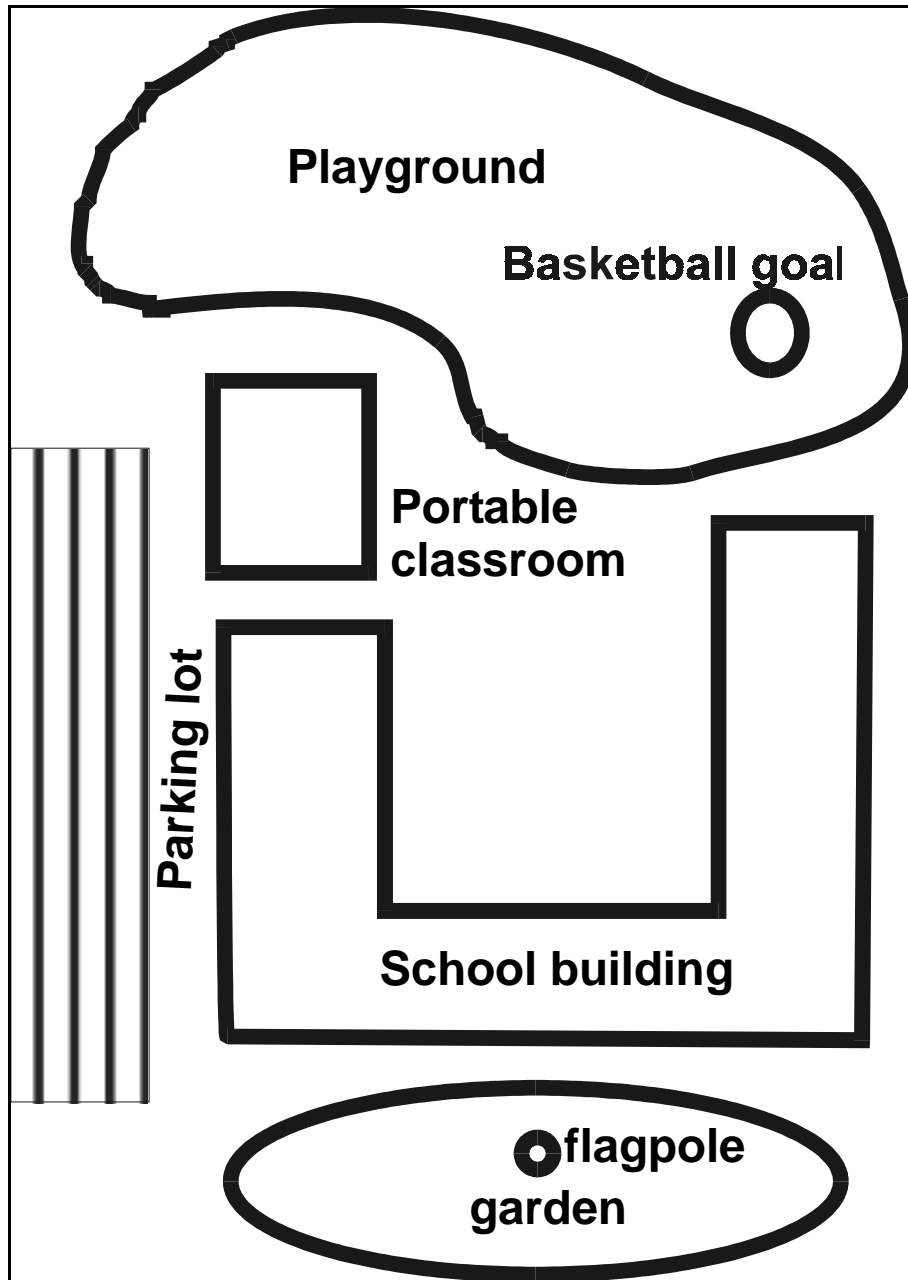
### **Correlation to National Science Standards**

Unifying Concepts and Processes  
Science as Inquiry

### **Correlation to Arkansas Frameworks**

Science: 5-8: L.S.1.1, L.S.1.3, L.S.2.9, L.S.3.4; 9-12: L.S.1.2, L.S.1.5, L.S.1.6, L.S.2.18, L.S.3.4  
History: 1.1.2  
Social Studies: 1.1.3, 1.1.5  
Math: D.S.P.1.1.A, D.S.P.1.1.C  
Language Arts: R.2.1, R.2.7, L.S.V.1.10

# Sample Schoolyard Map



## Sample Plot Chart

### Study Area Number Five

<b>Plant Name Or Description</b>	<b>Approximate Plant Number</b>	<b>Plant Environment</b>	<b>Plant Traits That Fit Environment</b>
Elm tree	1	Shady, but dry, thin sandy soil, slight hill	Tall to reach light, hairs on small leaves to save water
Gray lichen	Many	On oak bark and rocks shady	Rootlets into substrate, flat so won't blow off
Dandelion	5	Sunny, grassy, open area	Puffy seeds to blow and disperse, bright color to attract insects

# Plot Chart

Sample Area \_\_\_\_\_

	Plant Name or Description	Approximate Plant Number	Plant Environment Description	Plant Traits That Fit Environment
1				
2				
3				
4				
5				
6				

